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AMC Pamphlet
AMCP - 385-72

SAFETY DIGEST

UNIV. OF FLORIDA LIBS.
DOCUMENTS
DEPARTMENT
U.S. DEPOSITORY

JULY
1966

Boat Trailers — Tips for Safer trips

LOADING YOUR TRAILER

❶

Never overload — if in doubt, check manufacturer's specifications.

❷

Hauling gear in the boat can be dangerous. You may overload the trailer or damage your boat.

❸

Haul a dry boat. Check especially after a heavy rain. The back and forth surging action of water can affect control and stability on the road.

❹

Before hauling a motor on the transom, check your boat manufacturer's recommendations and make sure your trailer support extends to the stern of the boat.

❺

Never let anyone ride in your trailer.

LOADING YOUR CAR TOP

1 Car-top boats should not exceed 150 pounds.

2 Center the boat on the carrier, tie down securely with strong rope or web belt, and check often enroute. Use a bow and stern tie-down for safety.

DRIVING WITH BOAT AND TRAILER*

1 Drive at moderate speeds. You can't stop as fast with added trailer weight.

2 Observe laws of states you travel through

3 Check your trailer often enroute. Watch for load shifting and loose, broken, or worn ropes, or other tie-downs.

4 Use a side-mounted rear view mirror, if your rear view is obstructed.

5 Give hand signals or extend directional signals to your trailer. Your car's rear turn signals may not be visible.

6 Allow plenty of clearance for passing, changing lanes and turning. For emergency stops, pull well off the road.

HAVE FUN ! ...
A SAFE VACATION
Is Always
A HAPPY Vacation

HEADQUARTERS
UNITED STATES ARMY MATERIEL COMMAND
WASHINGTON, D.C. 20315

AMC PAMPHLET 385-72 **JULY 1966**

The Safety Digest is an AMC Pamphlet prepared by the Safety Division, Headquarters, U. S. Army Materiel Command. Its purpose is to disseminate information which can materially influence and improve safety programs at all Command establishments.

Articles are included to supplement technical knowledge as well as practical knowledge gained through experience. They provide a basis for the further refinement of safety measures already incorporated in operating procedures and process layout. To achieve maximum effectiveness, the Safety Digest should be given widespread circulation at each AMC establishment.

Articles appearing in the Safety Digest are unclassified and are not copyrighted. They may be reproduced as desired in order to bring pertinent accident prevention information to the attention of all employees. The Army Materiel Command Safety Digest should be given a credit line when articles are extracted.

Unclassified material believed to be of interest or benefit to other establishments is welcome for publication in the Safety Digest. Please send articles for review to: U. S. Army Materiel Command Field Safety Agency, Charlestown, Indiana. If possible, include pictures, charts, drawings, and illustrations that clarify and heighten interest in your presentation.

SELWYN D. SMITH, JR.
Major General, USA
Chief of Staff

OFFICIAL:

STANLEY J. SAWICKI
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IN THIS ISSUE

FOREWORD I
IN THIS ISSUE II

COMMAND SAFETY OBJECTIVES 1
HYDRAULIC JACK LIFT AND TAILGATE SYSTEM 2
INDUSTRIAL HYGIENE FIELD OPERATIONS 6
SILVER SOLDER CONTAINING CADMIUM IS A HEALTH HAZARD 7
SAFETY SHOE WAS TOE SAVER 8
ACCIDENTAL X-RAY EXPOSURE 9
PREVENT EMERGENCY SITUATIONS IN FLIGHT 12
CAUGHT IN UNSAFE ACT 13
GIRL - EATING LION AND FINGER - BITING MACHINERY 14
TEACHING SAFETY IN TAIWAN 16
SAFETY ATTITUDES AND RESPONSIBILITY 18
CURRENT EVENTS:
- HE TIPPED A CROOKED BOX 19
- CRANE SLING CATCHES FINGER 20
- FALL STOPS SEARCH FOR JOURNAL 20
- LOCOMOTIVE CAUGHT HOUSE ON THE TRACK 21
- CARBON MONOXIDE OVERCOMES SOLDIER 22

MAKE YOUR POSTERS WORK HARDER FOR SAFETY 23
PLAN FOR PARKING LOT SAFETY 25
EXPLOSIVES SAFETY:
- SAFETY LOCKED INTO TEST FACILITY 27
- SAFE PRACTICES IN PROPELLANT SURVEILLANCE 31

HERCULES SAFETY THEATER 34
DO YOU KNOW? 36
SPECIAL EXTENSION COURSE IN SAFETY MANAGEMENT 37
REFERENCE PUBLICATIONS 38
NATIONAL SAFETY COUNCIL AWARD NOTIFICATIONS 39
AMC SAFETY AWARD PRESENTATIONS 40
PROTECTIVE SKIN CREAMS 41
WELL, DID YOU KNOW? 42
MISSION SAFETY - 70 ENVELOPE INSERT 43

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COMMAND SAFETY OBJECTIVES

Command objectives are an essential element of the total program for AMC. As such they represent major goals which are expected to be accomplished during the FY 1967-1971 program period. The attainment of the FY 1967 Targets, on schedule, will be a prime indicator to General Besson of how well AMC mission responsibilities are being met.

Command Objectives (Section II, Part One of Headquarters, AMC Program/Budget Guidance and Directive, FY 67-71, 1 April 1966) was published on 18 May 1966. Command safety objectives as listed therein are as follows:

● ECONOMY:

OBJECTIVE: Reduce accidents, injuries, and resultant costs each year at least ten percent below best AMC prior records:

FY 1967 TARGETS

Army Aircraft	9.1 accidents per 100,000 flight hours
Army Motor Vehicle	0.2 accidents per 100,000 miles
Military Personnel	2.16 injuries per 100,000 man-days
Civilian Personnel	1.2 injuries per 1,000,000 man-hours
Other Personnel	1.0 injuries per 1,000,000 man-hours
Accidents per 1,000 persons	5.0
Injuries per 1,000 persons	2.7
Cost per person	$14.50

● MANAGEMENT:

OBJECTIVE: Provide a means for fast AMC reaction to notification of unsafe Army materiel and establish an Army-wide procedure for rapid dissemination of necessary corrective safety information.

FY 1967 TARGET

Effect publication of implementing directive - 15 May 1967.

● SATISFACTION:

OBJECTIVE: Assure that AMC materiel supplied the Army for accomplishing its mission is the safest possible by monitoring safety statements, releases, and confirmations from AMC commands and installations, and by studying Army-wide accidents involving AMC-supplied materiel to determine those caused by defective materiel.

FY 1967 TARGET

Complete second study of Army-wide accidents - 31 December 1966

HYDRAULIC JACK LIFT & TAILGATE SYSTEM

J. V. Gorman
Production Supervisor
Hercules Powder Company
Radford Army Ammunition Plant

At Radford Army Ammunition Plant ninety percent of all propellant transportation between the various stages of processing is accomplished by truck. This facility, covering 4,138 acres, is served by sixty miles of roadway and approximately 400 different truck docks. Each month some 8,025,000 pounds of explosive materials are moved within the plant by trucks with inclosed bodies, called explosives vans.

Radford is engaged in the manufacture of large cast propellant grains to be used as charges for solid fuel rocket motors. The manufacture of these grains involves the use of a casting liquid of approximately 75 percent nitroglycerin. This casting liquid, contained in stainless steel pressure vessels called desiccators, is transported between the Nitroglycerin Area and the Cast Propellant Area by explosive vans. Each desiccator, capable of containing 1,000 pounds of casting liquid, is mounted on a wide, two-wheeled skid which can be moved with the aid of a wheeled hydraulic jacking device.

Because of the sensitivity of casting liquid to initiation from shock or impact, a study of methods used in the loading and unloading of explosives vans was made. This study was later enlarged to encompass all handling of explosive material at Radford Army Ammunition Plant. The enlarged study revealed that in other manufacturing areas, in-process propellants in a variety of granulations are placed on trays, stacked in open cabinets or buggies, and wheeled into explosives vans for transportation. Spillage of minute powder grains and contamination of the interior of the van with propellant dust particles are constant problems. In many cases, the propellant being transported is saturated with an ether-alcohol or acetone-alcohol mixture, adding the danger of flammable vapor atmospheres within the cargo compartment.

Due to differences in truck dock height and load weights, the interior floors of the explosives vans are seldom level with the loading dock surface. In the past, metal dock boards were used to bridge the space between the truck floor and the dock surface. This was strictly a stopgap measure because it did nothing to correct the vertical misalignment between the truck bed and the dock. The use of dock boards created several additional hazards. The size, shape, and weight of the dock board made it difficult to handle and set in place. Some degree of impact between the van floor and the dock board was unavoidable when placing the dock board. Unless the board was a perfect fit, each buggy wheeled across it caused the

impact to be repeated. The dock boards were fabricated from non-sparking metal; however, the danger of spilled powder granules or propellant dust in the van being initiated from impact was constantly present.

Because of the large number of truck docks in the plant it was impractical to furnish each dock with a dock board. It was necessary to haul the dock board from place to place inside the van, along with the propellant. Again the size of the dock board and its shape made it difficult to secure inside the truck, and the possibility of impact between the board and the interior of the van or its cargo could not be eliminated.

Of necessity the center portion of the dock board consisted of the heaviest construction which created a ridge between the truck and the dock. This ridge contributed to propellant spillage by jarring cabinets and buggies wheeled across it, and it also presented an impact to desiccators being loaded or unloaded. Buggies greater than twelve feet in length, which are used for large cast grains, would impact on this ridge unless the vertical alignment between the van and the dock was nearly perfect. The dock boards could not be fitted with side guards, and occasionally one wheel of a buggy being loaded into the truck would miss the side of the board. This could result in partial loss of the buggy's contents and contamination of the surrounding area with spilled explosive material.

Maintenance problems with the portable metal dock boards were also experienced. After a brief period of use the dock board tended to develop hairline cracks. Since these cracks represented potential failure of the board, a periodic inspection program was necessary. The cracks also presented a collection point for explosive contamination and the possibility of the initiation of this material from flexure.

In an effort to eliminate dock board problems, levelator systems were installed on explosives vans at Radford for evaluation in 1963. They have proven to be very successful.

The levelator system consists of three major components: two hydraulic jacks mounted on opposite rear corners of the van body and a hydraulically retractable steel ramp mounted on the rear of the van at floor level. Hydraulic power for these units is obtained from a pump driven by the truck engine. The two jacks can be operated individually from the control station at the left rear of the truck body. The function of these jacks is to correct vertical misalignment between the truck and the dock. By adjusting each jack individually the van floor can be brought into exact orientation with the truck dock.

In order to utilize this system to its fullest, slight modifications to the truck docks were found to be desirable. Wooden ledges were installed across the front face of the docks. These ledges are grooved to mate with a projection which extends across the underside of the retractable ramp. These wooden ledges serve two functions:

1. They prevent the ramp from being lowered completely into the loading position unless the truck is at right angles to the dock and is exactly the proper distance from it.

2. Once mated, they prevent inadvertent movement of the truck as long as the ramp is down.

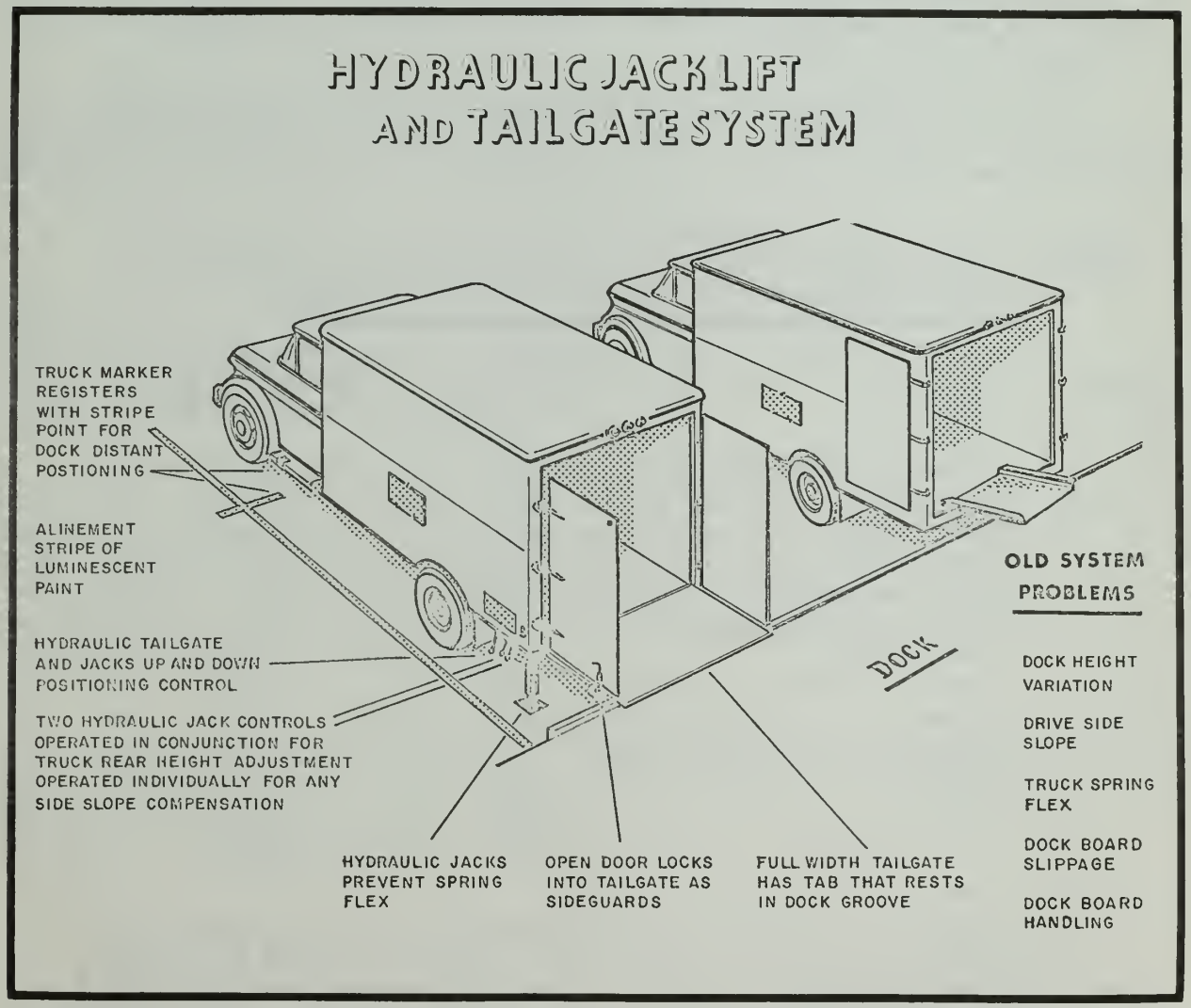
To back the truck into exact position with a minimum of difficulty, guide lines were painted on the roadway in front of each dock. By following these guide lines the truck driver can easily park his truck in the correct position for loading.

In operation the truck is backed into position in front of the dock and parked. The driver sets the parking brake, and, leaving the motor running, gets out of the truck and goes to the control station at the left rear of the van body. He first lowers and extends the hydraulic jacks, adjusting them to level the van body with the dock. His next act is to lower the retractable ramp into position between the truck and the dock. When the ramp is in place, the jacks are given a final adjustment to correct any remaining vertical misalignment. The driver then turns off the truck motor, opens the rear doors, and proceeds with the loading or unloading operation.

The levelator system has eliminated all of the problems encountered in the use of dock boards. Vertical misalignment is corrected regardless of the load on the truck. Since the retractable ramp is mounted (hinged) on the rear of the truck, outside the body, no metal-to-metal contact is involved inside the van when placing the ramp in the loading position. The ramp is braced on its underside by structural members, and its upper surface, over which material is moved, is perfectly flat. There is no raised center section to cause impact or propellant spillage. Loading and unloading long wheelbase grain buggies constitute no problem. The width of the ramp is the same as the interior of the van, and the van doors when opened can be latched to the sides of the ramp, forming sideguards. This practice eliminates the possibility of inadvertently pushing a buggy off the side of the ramp while loading or unloading the truck. Since the ramp is, in effect, self-storing, there are no extraneous objects to be hauled in the cargo space with the propellant or desiccators of casting liquid.

The ramp does not impact inside the truck, and the material from which it is constructed need not be non-sparking. It is power operated and need not be of lightweight construction. These conditions permit the use of stainless steel in the fabrication of the levelator ramp instead of aluminum alloy as in the case of the portable dock board. Stainless steel construction is much more resistant to cracking from heavy use and as of this date no difficulty from this quarter has been experienced.

The levelator system, although it represents a higher initial investment, is far superior to portable dock boards for use in the transportation of explosive materials. By using the levelator system, the danger of a serious incident with accompanying injury to personnel and equipment damage is sharply reduced.


HYDRAULIC JACK LIFT
AND TAILGATE SYSTEM
TRUCK MARKER REGISTERS WITH STRIPE POINT FOR DOCK DISTANT POSTIONING
ALINEMENT STRIPE OF LUMINESCENT PAINT
HYDRAULIC TAILGATE AND JACKS UP AND DOWN POSITIONING CONTROL
TWO HYDRAULIC JACK CONTROLS OPERATED IN CONJUNCTION FOR TRUCK REAR HEIGHT ADJUSTMENT OPERATED INDIVIDUALLY FOR ANY SIDE SLOPE COMPENSATION
HYDRAULIC JACKS PREVENT SPRING FLEX
OPEN DOOR LOCKS INTO TAILGATE AS SIDEGUARDS
FULL WIDTH TAILGATE HAS TAB THAT RESTS IN DOCK GROOVE
DOCK
OLD SYSTEM PROBLEMS
DOCK HEIGHT VARIATION
DRIVE SIDE SLOPE
TRUCK SPRING FLEX
DOCK BOARD SLIPPAGE
DOCK BOARD HANDLING

INDUSTRIAL HYGIENE FIELD OPERATIONS

During the calendar year 1965, the Army Medical Service of the U.S. Army Environmental Hygiene Agency completed thirty-one comprehensive industrial hygiene surveys of major ZI installations.

The military population of the surveyed installations (excluding Eighth Army) was 180,106, and Federal civilian employees numbered 58,791. There were 564 locations reported where it was determined that the health protection measures were inadequate or substandard. In each case appropriate preventative or control measures were prescribed. A total of 2,642 personnel were involved directly with these inadequately controlled operations.

The Surgeon General has a continuing program of comprehensive surveys of AMC installations. If a problem of particular concern exists, a special survey may be requested through command channels to the Surgeon General. (See paragraph 5-3, AR 40-5).

The following table shows primary exposure and hazards which are known to exist. These hazards should receive continuing command attention.

PRIMARY EXPOSURE DATA REPORTED IN INDUSTRIAL HYGIENE SURVEY REPORTS COMPLETED IN 1965 AT LOCATIONS WHERE CONTROLS WERE INADEQUATE OR CONDITIONS SUBSTANDARD

Order*	Exposure	No. of Locations	Approximate No. of Personnel
1	Noise	174	1009
2	Carbon monoxide	44	335
3	Solvents	54	257
4	Paint mist	107	205
5	Metal fumes	38	189
6	Toxic dusts	26	184
7	Chemical reagents	35	101
8	Pesticides	13	93
9	Chemical Warfare Agents	4	66
10	Acids	30	47
11	Radiation (nonionizing)	5	12
12	Alkalies	3	9
13	Others	31	135
	TOTAL	564	2642

* Based on number of personnel at risk.

The thirty-one survey reports included an inventory of 3,528 operations with an occupational health risk found to be adequately controlled from the health protection viewpoint at the time of the survey.

SILVER SOLDER CONTAINING CADMIUM IS A HEALTH HAZARD

U.S. Department of Health, Education, and Welfare
Public Health Service

Persons in industry and hobbyists who use silver solder containing cadmium metal may be flirting with a serious health hazard and not know it, the U.S. Public Health Service warns.

Two recent deaths related to the use in industry of silver solder containing cadmium underscore the danger. Cadmium, when overheated, vaporizes and produces cadmium oxide--a highly dangerous fume which can cause death even when inhaled in small quantities.

Dr. Paul Joliet, Chief of the Public Health Service's Division of Accident Prevention emphasized that the risk lies in the fact that the fumes of cadmium are practically odorless and lethal doses can be inhaled without any irritation or discomfort that would give a warning. In addition, it may take from four to eight hours for serious symptoms to develop.

Cadmium is used in only certain types of silver solder. The commonly used tin-based solder does not present this hazard. Whenever cadmium-based solder is used, precautions should be taken to avoid breathing the solder fumes, and to assure the work area is well ventilated.

Cadmium gives solder a strong adhesive quality for joining dissimilar metals. Cadmium is found in solder commonly used in the aerospace and jewelry industries. With the popularity of home-made projects and small home torches replacing soldering irons, more cadmium bearing solder is finding its way into homes.

The worker deaths occurred in California and Utah. In the Utah case, the worker told his physician that he had been working with ammonia and neglected to mention silver solder. His illness was consequently first diagnosed as "ammonia poisoning." It was not until after his death that tissue tests made at the suggestion of the State health department revealed cadmium poisoning.

Part of the problem, the Public Health Service's Division of Occupational Health says, is that there are few requirements for labeling of hazardous industrial materials. In the case of the silver solder used in Utah, there was only a 1 1/2 x 2" loose tag which said: "Contains cadmium, emits dangerous fumes if overheated."

The Division of Occupational Health also stresses that all workers shall tell their physicians what their jobs are and what types of materials they handle. Occupationally caused illnesses and diseases can be easily overlooked if physicians do not have this vital information.

SAFETY SHOE WAS TOE SAVER

Henry C. Belcher, an Aberdeen Proving Ground employee, is walking normally today because he made use at home of a safety practice he learned at work.

Mr. Belcher was using his new riding rotary mower to mow his lawn. The machine lodged between a sidewalk and the wall of a building. Mr. Belcher tried to free the mower, and his right foot slipped under the guard into the path of the rotating blade.

Mr. Belcher's work at Aberdeen Proving Ground makes it necessary for him to wear safety shoes on the job. The installation encourages its personnel to wear safety shoes and safety glasses for work around their homes. Mr. Belcher had put on his safety shoes before he began the work on his lawn. The right shoe, shown in the picture, took a terrific beating from the mower blade, but it saved the foot from mutilation.

Mr. Belcher returned to work on Monday with two bruised toes and a deep respect for power mowers and safety shoes.

ACCIDENTAL X-RAY EXPOSURE

The following description of an X-ray exposure incident is presented, along with the conclusions of the AEC Investigating Committee, for the information and benefit of users of similar devices. The significant aspect of this incident is the manner in which the X-ray unit developed a short which permitted continuous beam production with the bypassing of all interlocks and controls. This type of incident, involving the use of an X-ray device operating at higher beam energy and/or current, could have severe medical implications.

Recently, two AEC contractor employees were exposed accidentally to X-rays while attempting to radiograph a small metal object. During the course of a series of exposures, the X-ray unit started continuous operation due to an internal short. The short was located so that all interlocks and controls were bypassed. As a result, the men performed several operations in the direct beam, unaware that the machine was operating.

The X-ray machine was suspended approximately 109 inches above the floor with the beam directed downward. The object to be radiographed and the radiographic film were located on the floor. This geometry resulted in exposures to the men from above while they were making beam alignments in standing and crouching positions. At one point, one employee climbed a ladder adjacent to the X-ray unit and with his right thumb held a plumb line in the beam for a few seconds within an inch of the tube window. Both employees sustained Class "B" skin exposures, and the employee who held his hand near the operating unit received approximately 3,500 rem on the end of the right thumb. Nothing of clinical significance was found except for an erythema on the end of the exposed thumb. The erythema first appeared about fourteen days following the exposure, followed by evidence of a second-degree burn on the twenty-sixth day. Five weeks following the exposure, a healthy layer of dermis remained.

The X-ray unit involved was a portable industrial model of the self-rectifying half-wave type with a five-milliamperes tube current rating and a 110-kilovolt peak tube voltage. The control console and X-ray head are connected electrically by a cable. The exposure in this incident resulted when a conductor in the cable came loose from its connector pin and made contact with the control console chassis through the connector shell, bypassing the normal X-ray controls and interlock.

DESCRIPTION OF X-RAY UNIT'S SEQUENCE OF OPERATION

The schematic diagram of the X-ray unit (see figure 1) shows that the unit is designed to be operated as follows:

1. Main switch is closed.

2. This action puts power on the autotransformer which is adjusted to the proper reading on the kv meter

3. No power is provided to the high-voltage transformer because contact 2B is open.

4. The X-ray tube filament is energized through transformers connected to terminals A-3 and E-3.

5. A safety switch, which in this installation was the X-ray room door interlock, is closed.

6. The timer is set and the pushbutton is pushed to connect the timer.

7. The X-ray exposure button is pushed and the following operations result:

   a. Relay RE-2 energizes.

   b. Contact 2B closes, putting power on the X-ray tube high-voltage transformer (at a slightly reduced level) generating X-rays.

   c. The neon "exposure-on" light across relay RE-2 comes on.

   d. Relay RE-1 is energized.

   e. Contact 1A locks in across the X-ray exposure button.

   f. Contact 1B puts full voltage on the X-ray tube.

8. Timer times out.

9. Relays RE-2 and RE-1 drop out and contact 2B opens which de-energizes the X-ray tube transformer. "Exposure-on" light goes out.

Description of X-ray Unit's Failure

During this period of trouble, the normal procedure was followed and the timer functioned as it should, the "exposure-on" light came on and went off, and relays RE-2 and RE-1 operated satisfactorily. Wires A-3, C-3, and E-3 are carried in the cable between the control console and the tube head. The wire in the cable, going to terminal C-3 in the cable connector at the control box end, was apparently connected with a poor solder joint in manufacture. It broke loose and shorted to the control console through the connector (see figure 1), which is at ground potential. Since the control box was connected to the powerline so that terminal A-1 was the phase side, the high-voltage transformer was energized whenever the main switch was closed, regardless of the condition of relay RE-2 and the "exposure-on" light.

Conclusions

It was concluded by the Investigating Committee that the primary cause of the exposure incident was an equipment malfunction. Even though a cable connector failure (such as occurred in this case) is highly unlikely, there are other more likely failure possibilities: e.g., relay RE-2 could fail to open for mechanical reasons, which could result in the same unsafe condition. It is not good when simple equipment malfunctions can bypass all safety controls and indicators and make an unsafe unit appear to be operating safely.

Division of Operational Safety
U.S. Atomic Energy Commission
Washington, D.C. 20545

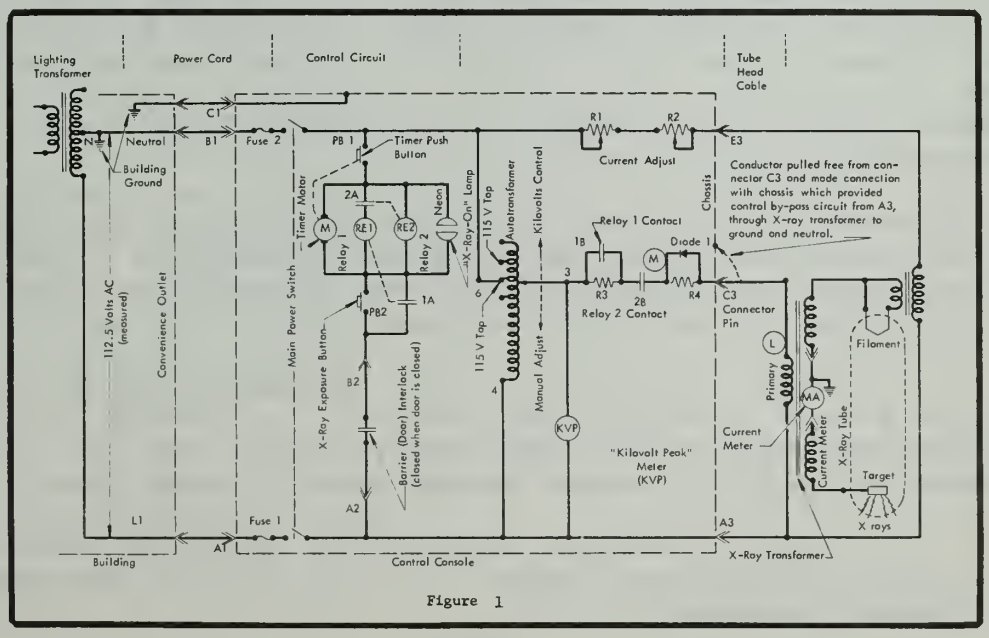


Figure 1

PREVENT EMERGENCY SITUATIONS IN FLIGHT

The narratives on accident reports received in FY 1966 suggest quite definitely that some of the aircraft accidents involving Army Materiel Command personnel need not have happened.

In one case a pilot took off with only his main fuel tank filled and flew until the low fuel level warning light came on. Before he reached his home airport both motors quit because of fuel starvation. He crash landed in a corn field three-fourths mile short of the runway, about 26 minutes after the warning light appeared. The pilot received a disabling injury and a $444,000 aircraft was destroyed.

Another pilot was returning from a routine administrative mission, accompanied by a second pilot who was receiving aircraft transition training. Thunderstorm and rainshower conditions prevailed as the plane approached the airport. The ILS and VOR were out of service but the pilot continued his landing effort. After he was informed that visibility on the ground was down to one-eighth mile the pilot elected to divert to another airfield. The radar operator asked if he wanted a vector to that field and for information about his intentions. The pilot replied, "Negative." Shortly thereafter the aircraft flew into a small hill a few miles from the airfield. Both pilots were killed and a plane valued at $115,250 destroyed.

A pilot flew a helicopter on a mercy mission during severe weather. He encountered a heavy snow shower that caused him to become disoriented. He turned back until he was clear of the shower, recovered his bearings, and continued his effort to complete the mission. Once more he flew into a snow shower. The aircraft struck a tree, crashed to the ground and burned. The pilot was killed and a second man received disabling injuries. A $138,000 aircraft was destroyed.

Although all aircraft accidents are not as clear-cut as these examples appear to be, there are simple and practicable ways to reduce the likelihood of Army aircraft accidents. Here are some that are widely applicable:

1. Those installations that have assigned pilots and aircraft should have firm policies for the control of take-offs and landings during unfavorable flying weather. Only the most compelling reasons should justify exceptions.

2. Flight plans and fuel supply should be correlated to the extent that empty tanks will not lead to emergency landings or crashes.

3. Vigorous and continuous efforts should be made to detect and correct mechanical deficiencies that might lead to emergency conditions in flight.

4. Proper attitudes towards safety should be developed and maintained among flying personnel. They should be true Army aircraft accident prevention specialists.

Accidents often follow emergency situations, including mechanical failures that arise when aircraft are in motion. The best tools for coping with the aircraft accident problem are forethought and vigorous action to prevent emergency situations.

CAUGHT IN UNSAFE ACT

A safety director who was escorting a visiting safety inspector about his installation was a startled observer of the following action:

A male employee placed a ten-foot step ladder alongside a one-story building with twelve-foot eaves. With a paint brush in one hand and an open gallon bucket of yellow paint in the other, the man scampered up the ladder. He hopped up onto the building roof which was sloped at about a 45° angle and ran up the roof to the ridge. There he proceeded to paint three vent pipes a pretty yellow.

The alacrity with which this action was accomplished was proof that the whole series of unsafe acts had been practiced quite a number of times without a serious slip, fall, or spill.

Unsafe acts of employees are usually repeated many times before an accident occurs. If supervisors are observant and take prompt and firm action when action is called for, they can prevent most accidents. "Observing" must be more than just "seeing." Observing involves seeing and evaluating. In performing his accident prevention effort the supervisor should evaluate the risk or accident potential of each act and the potential of series of acts occurring in sequence. Then action should be taken.

The man on the roof did get down uninjured. On the ground he was met by a boss who took prompt and firm action to persuade him to change his ways.

- Pete's Letter to Supervisors
Aberdeen Proving Ground

GIRL-EATING LION & FINGER - BITING MACHINERY

T. R. Gooch, Safety Engineer
Thiokol Chemical Corporation
Huntsville Division

The city of Nairobi in Kenya, Africa, had a great safety hazard. The population of 54,000 was alarmed about it. In February 1963, the hazard devoured a young girl. It was a girl-eating lion.

If news were out that a lion was on the loose in your work area you would be alarmed. In fact, it would just about panic the plant population. You couldn't hit a lick until the hazard of the lion was removed. You wouldn't necessarily care if it were killed or caged up, so long as it was rendered harmless to you.

You have hazards almost as bad as the girl-eating lion right in your installation. They are the finger-biting machinery.

Machinery is necessary to get your work done, so you can't kill the hazards by stopping the machines. For this reason, you must cage the hazards with guards in order to render them harmless to your people. You must avoid getting too close to the hazards of machinery when you know they are dangerous just as you would never venture too close to a lion's cage.

Machinery may be defined as almost any appliance with which people work. A cable, pulley, and a hook is a machine. Any device consisting of two or more working parts is a machine. You have hundreds of machines about in every job, and these machines are finger-biting machines.

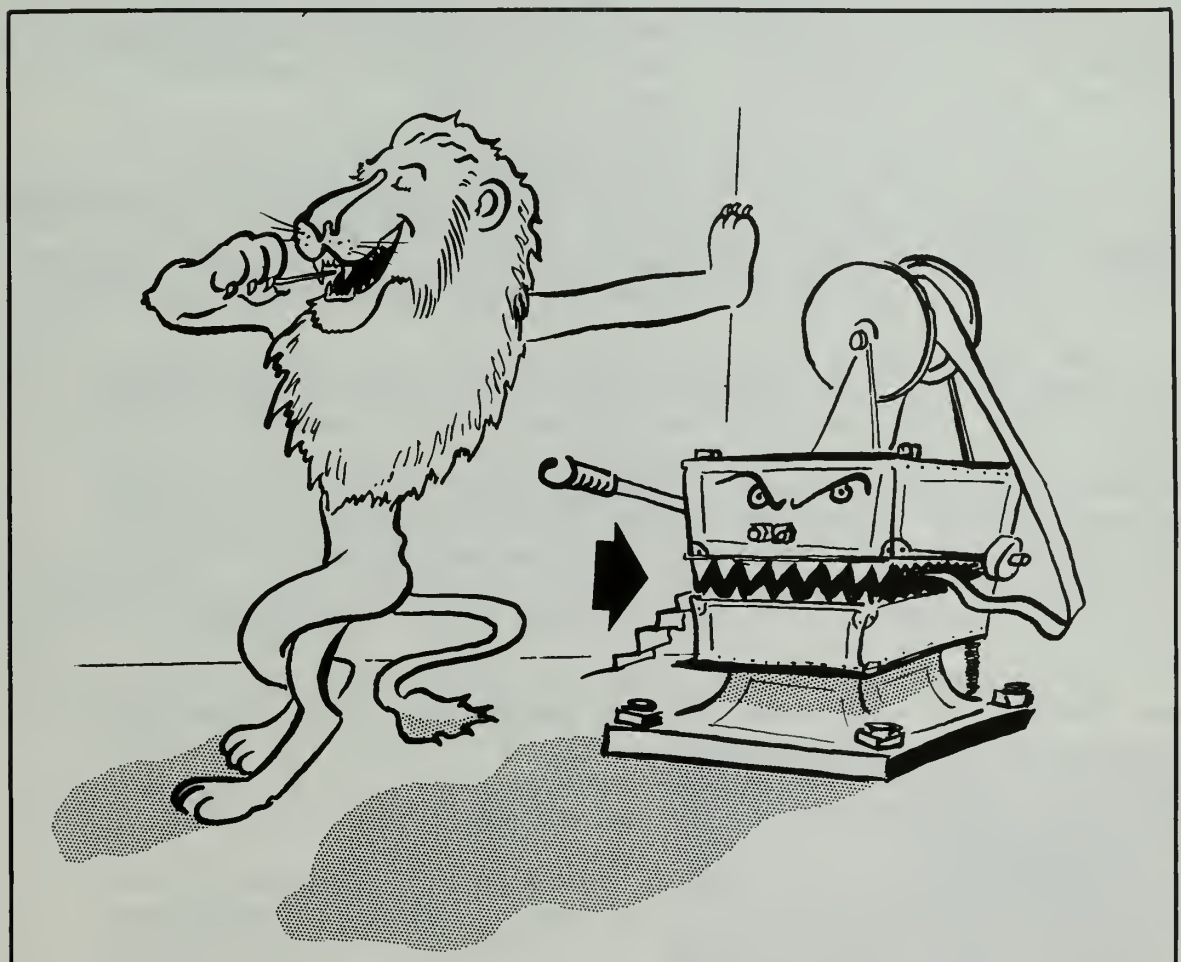
There were 340,000 disabling finger injuries sustained in the United States in 1964. This proves you have finger hazards loose in the country. We should be alarmed about this fact as the people of Nairobi were alarmed over their hazard of the girl-eating lion.

A finger-biting machine can literally bite off fingers!!

Machines do not stop with fingers. They are capable of devouring a hand, an arm, or the entire body.

There is needless suffering involved with finger injuries. A lot of work efficiency is lost with each one. A small nick or scratch could become infected and result in serious complications. Such complications must be charged to the small wound caused by the biting machinery; total loss of time could develop.

Survey your work locations and job activities for machinery which may be hazardous to fingers. Take steps to guard against the hazards by actually securing guards for the hazard points or developing measures to keep your people away from the danger zones.



➡ Avoid being the victim of finger-biting machines.

TEACHING SAFETY IN TAIWAN

F. E. Reilly and J. M. Rossi
Safety Division, Picatinny Arsenal

(Editor's Note: A few months ago two members of the Picatinny Arsenal Safety Division were selected to teach the American explosives safety methods to the Army of the Republic of China (Taiwan). In the following article they tell about their experience.)

Teaching any subject to any group of people is primarily a problem of communication. When this basic problem is complicated by a language barrier and differences in ethnic background and philosophy a real challenge is presented. This was the situation we faced in Taiwan.

In early July 1965 we were assigned the mission of assisting the Chinese military in their Arsenal Safety Program. This assignment was the result of a request made by the Chinese Military Assistance and Advisory Group (MAAG) shortly after a serious incident at one of the Chinese installations.

The next thirty days were a whirlwind of preparation, passports, shots, air reservations, and a mad scramble for training and teaching aids and plans. It is worthy of note at this point that future training teams going abroad should prepare to take all their training aids with them or make arrangements to use those available at the training site. In our case some of the training aids scheduled to follow us to Taiwan failed to arrive until after the teaching phase was well underway. This handicapped us to some extent.

We departed on 15 August for Taiwan. Upon arrival we were pleasantly surprised by the progressive conditions we found. The first few days were spent in settling down and becoming acquainted with the MAAG personnel, the Chinese officials and officers with whom we would be working.

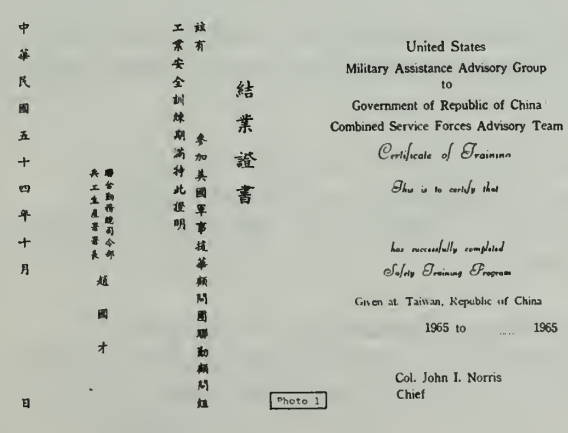
Once we had been briefed, the situation became clear and a plan of approach was developed. First, we arranged to visit operational arsenals for survey and orientation. The cooperation we received was excellent, and our visit enabled us to grasp the complete picture. Next came a period of analysis and review of what we had observed, discussion with liaison officers, and finally the development of a training course designed to meet particular needs. The plans developed prior to departure had to be scrapped when on-site observations were evaluated.

Our first course was presented in mid-September. As we expected, we found a need for some further revisions, deletions, and additions. It immediately became apparent that while most of the Chinese officers and top level management civilians we were to teach understood English, the use of an interpreter was necessary. This lengthened teaching time, but improved total understanding.

A total of 235 officers and civilians were graduated from a twenty-hour five-day course that included Safety Management and Programming, and Industrial and Explosives Safety. The training included a special portion on quantity-distance determination. A certificate that was issued to each graduating student is shown in Photo 1. A typical class is shown in Photo 2.

The main problems we encountered were the language barrier and a safety philosophy not quite like our own. The language barrier was alleviated by use of an interpreter. The theory of limiting the exposure of the least amount of personnel to the least amount explosives for the least amount of time remained a problem due to centuries old Oriental concepts. As there is a lack of labor saving devices and automation, manpower is utilized, resulting in high personnel allowances and exposure. Whether the safety philosophy of our students changed remains to be seen.

The tour of duty was an interesting challenge and gratifying results were obtained. Student enthusiasm, particularly among the younger officers, was very apparent. Their complete acceptance, cooperation, and earnest desire to learn made teaching a pleasure. Even before we left some changes were made or in process. Both of us felt the time and money expended in teaching our safety concepts and procedures to the personnel of a friendly nation were well worth the effort.



結業證書

United States
Military Assistance Advisory Group
to
Government of Republic of China
Combined Service Forces Advisory Team

Certificate of Training

This is to certify that

has successfully completed
Safety Training Program

Given at Taiwan, Republic of China
1965 to 1965

Col. John I. Norris
Chief

Photo 1

Photo 2

• SAFETY ATTITUDES AND RESPONSIBILITY

C. R. Wells, Safety Technician
Rohm and Haas Company
Redstone Arsenal

As a prelude I must first make myself clear as to my feelings concerning the purpose and intent of any and all accident prevention programs. The major goal of such activities is to improve the attitude of each employee toward his safety responsibility.

This change or modification of individual attitudes may be accomplished in many ways. Lectures, group meetings, signs, and posters may be used. Policy and enforcement practices also play a major role. But bear in mind the following statement: "The one great modifier of personal attitudes has always been, and will remain, the observed actions, attitudes and consequences thereof, of other employees and, most especially, their own and other supervisory personnel." The overall attitude of any section, department, or group is a reflection of the attitude of that particular supervisor. The supervisor is the "key" man in any accident prevention effort. He is entrusted with far more responsibility than some realize or acknowledge. His own health and well being, as well as that of each individual employee he supervises is in his hands. This responsibility may not be delegated. The various inspections and reviews serve only to establish the extent to which this responsibility has been accepted.

The words "Safety Program" are a much used misnomer incorrectly applied to any form of action taken by an organization in an effort to reduce industrial accidents. Relative safety, or the lack of it, may be construed as the result of action or inaction by responsible personnel within an organization. The success or failure of any accident prevention program depends, to a great extent, upon the successful application of these three basic accident prevention activities:

1. Motivation - Creating in each individual the desire to act safely even when it may be less convenient to do so.

2. Education - Learning about potential hazards and safe operating procedures through group meetings and individual instruction.

3. Engineering - Protecting against known hazards by proper design of facilities, equipment, and processes, minimizing both the possibility of accident and the exposure of personnel in event of an accident.

All accident prevention programs should be designed to accomplish these ends. It is the safety man's duty to advise and assist responsible supervision in the application of motivation and enforcement principles to bring about the desired changes.

CURRENT EVENTS....

HE TIPPED A CROOKED BOX

Boxed ammunition was being removed from storage for transfer to a surveillance workshop where it was to be inspected. A forklift truck was used to move the boxes from their storage site to a waiting cargo truck.

Two Army employees placed four boxes on the forks of the forklift. A fifth box was stacked unevenly on the top of these four. One of the workers leaned against the load as he made an effort to straighten the box. His weight tipped the stack and the boxes fell. One that weighed 212 pounds struck his right forearm and fractured both bones.

When the accident was investigated it was found that the forklift forks had been pushed so close together that they provided only 12 inches of support surface. The ammunition boxes were forty inches long. The supporting ends extended far out on each side of the forks, making it easy for the man's weight to tip the load.

Employees who were assigned similar work were taken to the site of the accident. They watched a demonstration of how the accident occurred and how it might have been avoided.

Forklift operators were given fresh instructions to secure sufficient surface support for their loads by spreading the forks on their machines to the maximum distance necessary or possible.

CRANE SLING CATCHES FINGER

A mechanic was performing an assembly of vehicle components. One of the steps in the work involved the use of an overhead electric crane to lift a cupola from a worktable. The cupola had three eyelets where lifting connections could be made with a three-hook chain sling.

The mechanic lowered the crane, put two hooks into eyelets, and secured sufficient tension to hold these in place. He attached the third hook and held its chain sling leg to maintain enough tension to keep the hook in the cupola eye. He then activated the electric crane. The crane tightened the sling and caught his left hand against the cupola. Before he could release the load the pressure caused a compound fracture of his index finger.

Corrective actions taken by the installation to prevent similar accidents included the following:

1. Indoctrination was provided supervisors and employees on proper usage of hoisting equipment slings.

2. Hoisting slings were modified to eliminate the need for the operator to hold the sling leg to prevent hook dislodgement.

FALL STOPS SEARCH FOR JOURNAL

The library was filled to the bursting point with reference publications. Due to lack of shelf space the overflow section of technical journals was filed in rows across the tops of several cabinets. Ready access to these was made difficult by the fact that the library ladder had become unsafe to use. Unsuccessful efforts had been made to borrow a serviceable ladder or to secure a new one to replace it. The librarians managed the best they could with what was available.

A library patron came in and asked for a specific journal. This proved to be one of those stored on top of the cabinets. A librarian pulled a chair in place, removed her shoes, and climbed up to locate and pull the publication. When she started to step down from the chair, she slipped and fell. A bone in her right wrist was broken.

The installation safety office pointed out that use of a chair to climb up for stored publications was an unsafe practice. It was discontinued. A substitute ladder will be used until a library ladder with hand rails is obtained. As soon as space and equipment is available, the overflow journals will be removed from cabinet tops and filed on shelves.

• LOCOMOTIVE CAUGHT HOUSE ON THE TRACK

A wooden building was to be moved from one location to another on the installation. The contractor who was doing the work loaded the building on a low bed trailer and started down the road.

The route led through a gate in an installation fence and across a public carrier's railroad track. There was a distinct hump in the road as it went up and over the railroad embankment. Visibility was poor, for there was a sharp curve in the railroad as it approached the crossing and a heavy snow was falling.

The operator drove his tractor up the hump and across the tracks. There he was brought to a full stop as the low center of the trailer lodged on the track. An attempt was made to pull the trailer loose, but no flagman was sent down the track to stop any train that might be approaching. When a locomotive did come around the curve, its engineer was startled by the sight of a tractor, a trailer, and a house on the track close ahead. He could not stop before his engine passed over the crossing.

The crash separated the tractor from the trailer at the hitching point. The tractor was shoved to one side of the track and the trailer to the other with no discernable damage to either. The passing locomotive caught the overhang of the building and knocked it off the trailer and against the fence. The smashed structure was considered a total loss.

The installation instituted a requirement that railroad crossings be checked for proper vehicle clearance before being used by out of the ordinary loads. Whenever needed, flagmen would be stationed to halt oncoming trains.

Photo 1
Hump in the railroad crossing.

Photo 2
The smashed building shown in Photo 1.

CARBON MONOXIDE OVERCOMES SOLDIER

An enlisted man decided to eliminate a rattle that had started in the exhaust system of his 1965 model automobile. The weather was cold, and he backed the car into his garage before he started the work. Because he knew it was unsafe to operate a gasoline motor inside a closed building, he left the garage door open for ventilation.

The soldier started the motor and crawled under the car to find and correct the condition that caused the rattle. He was soon overcome by the concentration of carbon monoxide produced by the engine.

The motor had been running for a short time when the soldier's wife came to the garage. She discovered her unconscious husband on the floor under the car and summoned help from a neighbor. The neighbor pulled the unconscious soldier from beneath the car and dragged him outside into the fresh air. He then called for an ambulance. The soldier was moved to the base hospital.

He was revived and was able to return to duty after three days spent in recovering from carbon monoxide poisoning.

The Unit Commander devoted his next two command information periods to the dangers of carbon monoxide poisoning and the ways these dangers can be reduced or eliminated. The enlisted man who had been overcome was given individual counselling on the subject.

MAKE YOUR POSTERS WORK HARDER FOR SAFETY

In FY 1966 the AMC Field Safety Agency procured about 47,000 safety posters for distribution to AMC installations and activities. Additional quantities were purchased and used by the contractors who perform operations at many of these installations. The Army safety personnel at many installations also met their special needs with locally designed posters and with material obtained from a variety of sources.

This shows that posters are widely accepted as a worthwhile part of a complete safety program. It does not reveal how effectively they are being used.

Here are a dozen suggestions that may help you make your posters work harder for safety:

1. PLAN AHEAD - You will require posters that can be seen every day of the year. You can make your work easier by planning your poster displays while you are preparing your safety program for the year. Review the use you have been making of posters and make plans for any needed improvements.

2. PROCURE AHEAD - Order your posters well in advance of the time you will need them. The printing of some of your selections may be sold out before your order is received. If you have allowed adequate time, you may be able to secure another that meets your needs.

3. PICK POSTER FOR AUDIENCE - Of course you do not warn mechanics about the hazards of wearing high heels or secretaries about danger points on heavy equipment. There are many less obvious groups that may be exposed to posters that do not apply to them. When you show them something that is clearly out of place you invite a negative response to your effort to promote safety.

4. LOCATE POSTERS CAREFULLY - Display posters at places where people pass, slow down, or stop frequently. Sites near water fountains, time clocks, telephone booths, vending machines, tool rooms, and smoking stations are excellent. Displays inside cafeterias will be seen by many people.

5. USE GOOD LIGHTING - Unless it is well lighted, by either natural or artificial light, your poster may be passed unseen. A warm, colorful background will help catch the eyes of your personnel.

6. KEEP DISPLAYS UNCLUTTERED - Ordinarily one safety poster is enough for one location. A crowded display is less attractive and less likely to get the complete attention of the viewer. Concentrate on getting one safety poster idea into the consciousness of the viewer.

7. CHANGE POSTERS FREQUENTLY - After the viewer sees the same picture several times he may stop being aware of it. Give him frequent safety messages by changing the poster often. In many locations a poster grows stale in a week. Change it.

8. USE MORE THAN ONCE - If you display safety posters over four water fountains, four posters can give you a fresh poster for every fountain every week for a month. With a little ingenuity you can get increased use from your posters.

9. KEEP A RESERVE SUPPLY - If a sudden need arises or an order is late in delivery, extra posters will be needed. The efficient safety office will put up some of its spares rather than spend its time ordering or telephoning frantically for something to meet the crisis.

10. MAKE YOUR OWN - Occasions often arise when local photographs or clippings will create keen interest. If safety glasses save a worker's sight, photographs of the man and the shattered lens should command full attention throughout your installation. Put them up promptly. (Your Information Officer and the editor of your plant newspaper will also welcome pictures that tell clearly how accidents or injuries were prevented.)

11. USE PERMANENT DISPLAYS - Some ideas and subjects merit permanent displays. Posters that give fire fighting, rescue and first aid instructions are examples of these. Ingenuity is needed to make them interesting.

12. USE IMAGINATION - Remain alert for new and different ways you may use posters. There is more to it than tacking them on a bulletin board. Be on the lookout for ways other people and installations use them. Borrow or adapt other practices to your situation.

With a little more effort on your part you can make your posters work much harder for safety.

PLAN FOR PARKING LOT SAFETY

Thomas P. Browne
Supervisory Safety Engineer
U.S. Army Missile Support Command

To the casual observer, the parking lot might seem to be an unlikely source of disabling injuries and extensive property damage. The traffic engineer or safety director will see an entirely different picture. Upon analysis he may find the parking lot to be a high hazard area.

Let's take a hard look at the hazards that may be found in parking lots and passenger loading points. Here are examples of the most likely sources of parking lot accidents:

1. Employees may be struck by automobiles.

2. Employees may suffer injury while riding in cars that collide.

3. Pedestrians may slip and fall because parking lot surfaces and walkways are defective or covered with ice or snow.

4. Falls may be due in part to inadequate illumination during hours of darkness.

5. Pedestrians may walk or run in a hazardous manner in the parking area.

Parking lots exist to facilitate the movement of pedestrians and vehicles in a safe, convenient, and efficient manner. If they are to serve their intended purpose potential hazards must be eliminated or controlled. While each installation must analyze its own problems for the best local solution, certain basic rules should guide planning an accident prevention program for the parking lot.

1. The best location for a parking lost is inside the installation and away from major streets. Workers should not be exposed to additional traffic hazards by being forced to cross a busy street between their parked cars and their working areas.

2. The area should be free of the likelihood of damage to the vehicles' finish by noxious fumes, gases or vapors from smokestacks or exhaust vents.

3. Attention should be paid to the fire hazard created by large numbers of cars in a concentrated area.

4. Before construction starts all plans for new parking lots, with the driveways noted, should be reviewed by the Safety Office and the traffic engineer or the engineering department of the local Post Engineer. The same holds true for plans for changes in driveways or for new driveway openings in existing parking lots.

5. Parking lot aisles and stalls should be designed for maximum safety and efficiency within the lots themselves. Their design should also be related to the movement of vehicular traffic on adjacent streets.

6. All driveway openings should be large enough for the safe accommodation of traffic. A minimum width of 26 feet should be provided to allow two-way traffic to move safely through them.

7. View obstructions should be kept to an absolute minimum at entrances and exits.

8. The entire parking lot should be paved with an all-weather surface.

9. The surface should be maintained in good condition to prevent conditions that might cause trips, slips, and falls. In winter, snow should be removed as soon as possible, particularly prior to shift arrivals.

10. Signs and pavement markings should be used wherever needed to provide instructions on the correct parking and pedestrian patterns. All parking stalls should be marked on the surface of the parking lot. All signs and pavement markings should be well maintained.

11. Wherever a large area is covered by a parking lot, a sign indicating the aisle number should be provided for each aisle so that the employee can note the location at which he has parked his vehicle. These signs should be placed high enough to be seen over the tops of vehicles and should be legible from a considerable distance.

12. A traffic pattern should be established wherever possible by means of signs or pavement markings.

When our parking lots are properly laid out and unsafe conditions are eliminated by engineering techniques, our parking lot problems are half solved. Our remaining efforts should be directed toward elimination of unsafe acts committed by employees within the parking lot area. Actions planned by employee safety committee activities may be particularly effective in accomplishing this.

W. Struck and E. Sheldon
Picatinny Arsenal

The recently completed environmental simulation facilities of the Experimental Evaluation Section, Technical Services Laboratory, Ammunition Engineering Directorate at Picatinny Arsenal contain nearly all the equipment to create the environments that are normally "seen" by ammunition items. In conjunction with the creation of environments it provides facilities for monitoring and measuring the parameters of the items under test to laboratory standards for research and development, development and production quantities.

This group must conduct its efforts with explosively loaded test items in a safe manner. A complex of nineteen test cells is used. Maximum explosives permitted per cell is dependent upon cell wall thickness as outlined in paragraph 2622, AMCR 385-224. The need for safety through control of personnel and equipment is of the utmost importance. (See Photos 1 and 2.)

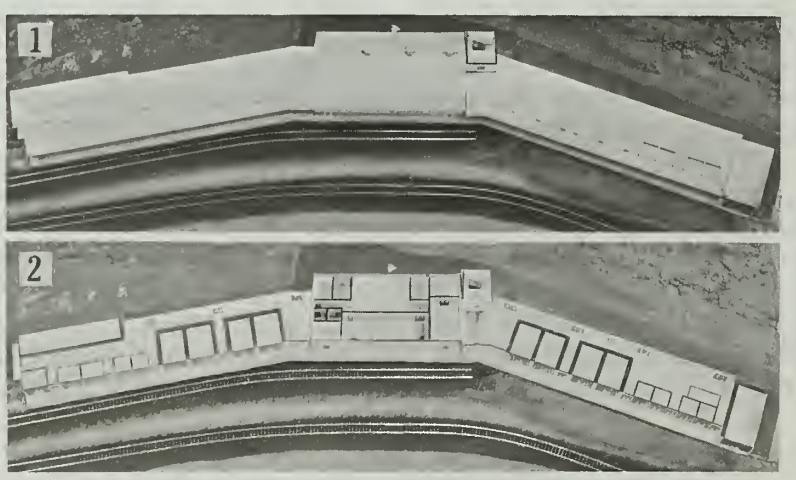
A significant feature of this complex is the method for the control of personnel entry into the test cells and operation of equipment. Each of the nineteen test cells in this complex has a separate control panel located in the centrally located control room. (See Photos 3 and 4.) Each panel contains a series of red and green lights for monitoring the operating position of various physical elements of each test cell. Each also has a key switch, safety plug, and sound powered phone plug. (See Photo 5.)

In order to enter any one test cell, personnel must first enter the central control room and turn the power on for the monitor lights and safety circuits for the bay. The key switch which enables all power to operate must also be turned to "Off" in order to be removed for subsequent use for entrance into the test cell. (See Photo 6.)

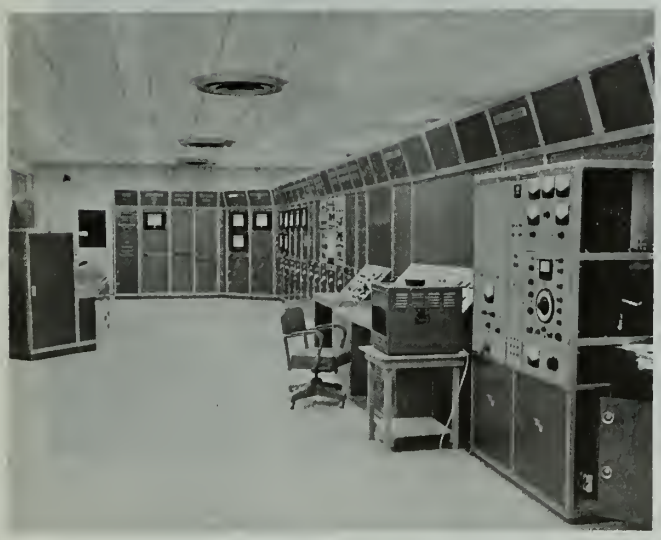
Using this safety key and the cell door key, which has to be obtained from a special key cabinet located in the laboratory office, operating personnel may now proceed to the alleyway. This runs behind and alongside each reinforced concrete wall and serves as an access to the cell to be entered. (See Photo 7.)

The safety key that was removed from the control console must now be inserted in the key switch located in the access alleyway. This will unlock the test bay door solenoid latch, and switch on an appropriate light on the central control room panel. Unlocking of the door allows entrance of personnel for the actual set-up of the test to be conducted. (See Photo 8.)

The procedure of locks and keys is reversed after the operation set-up is complete. The safety key must be re-inserted into the safety lock located in the panel for the specific test bay being used. No contact is made until the key is switched to the "On" position. A pre-coded safety plug must be inserted before the machinery or process may be put into operation. (See Photo 9.)



These photos of a model show the shape and arrangement of the building that houses environmental simulation facilities at Picatinny Arsenal. Photo 1 shows the shape of the building and one-foot and three-foot reinforced concrete walls that separate bays and extend above the roof. In Photo 2 the roof has been removed from the model. The separation of the test bays, thickness of the reinforced concrete walls, the corridor approaches, and the central control location are shown to scale.



PHOTOS 3 & 4

An overall view of the central control room is provided by Photo 3. Bay control panels, safety lights, interlocking control key set-up and a closed circuit television monitor are visible. Photo 4 shows a close-up view of part of the control complex.

PHOTOS 5 & 6

Monitor lights and other control panel details are shown in Photo 5. Photo 6 shows the location of the key switch on the control panel for an individual test cell. The switch which permits operation of power in the test cell must be turned to "Off." The key is removed for use during sequence leading to entry into test cell.

PHOTOS 7 & 8

The safety key removed from the control console is inserted in a key switch located in the test cell access alleyway. In Photo 8 the test cell is unlocked by a separate key that has been secured from a special key cabinet in the laboratory office.

PHOTO 9

After the operation set-up in the cell has been completed, the locks and keys procedure is reversed and the safety key is reinserted in the safety lock on the control panel.

SAFE PRACTICES IN PROPELLANT SURVEILLANCE

Norris S. Garman, Propellants Lab
Phillip R. Hosken, Jr., Safety Division
Picatinny Arsenal

The Propellant Surveillance Program is an activity conducted at Picatinny Arsenal to insure the safe storage and handling in the field of bulk quantities of propellant. By exaggerating conditions that accelerate deterioration of propellant, developing hazards can be detected before they become sufficiently substantial to endanger personnel and facilities.

Under requirements established by specification, a five-pound surveillance sample is taken from every lot of propellant at the completion of blending. This "master sample" is shipped by the manufacturer to Picatinny Arsenal, where it is stored in a surface magazine under normal temperature conditions. The master sample is retained until the parent lot is consumed or declared obsolete, or until pronounced instability is revealed in testing. A typical storage magazine is shown in Photo 1.

Upon incorporation of the master sample into the system, a test sample (45 grams) is weighed out and placed under observation in the propellant surveillance test. As always in handling bulk quantities of propellant, every safety precaution is observed to provide protection for personnel and facilities. All sampling operations are performed 100 feet from the storage magazine. The work tables are surfaced with conductive material which is grounded along with the balance and each propellant container. The operators are provided with safety glasses, conductive shoes and safety uniforms. Upon opening each container the exposed propellant is protected from direct sunlight. The operation is pictured in Photo 2.

The surveillance test temperature is 65.5°C., and it is maintained and controlled electronically in circular chambers that are sufficiently large to accommodate 2,000 samples. A typical heat chamber with the test samples is shown in Photo 3.

Currently some 16,000 individual samples are observed daily at Picatinny Arsenal.

The end-point for stability tests of nitrocellulose base propellants is reached when deterioration produces red fumes of nitrogen dioxide. When the red fumes appear in the eight-ounce glass-stoppered sample bottles, the number of days that the sample has been under test is computed, and that value is recorded as the test result. If the time-to-red

fumes is over 20 days, another sample is placed under surveillance and the testing program for all master samples is thus continuous. If the test result is not more than 20 days, the Ammunition Procurement and Supply Agency at Joliet, Illinois, is notified immediately. That agency transmits orders to its storage facilities throughout the United States directing the immediate special testing or destruction of the potentially hazardous propellant.

During the daily inspection and handling of propellant being conditioned under these rigorous high temperature conditions, the operator is adequately protected. Face shield, or safety glasses, asbestos gloves, safety uniforms, and protective vests are worn as shown in Photo 4.

Safety is the predominant feature during the final stages of the test, since the hazard potential is the highest at this time. The operators immediately remove from the heat chambers those samples that are found to be fuming. The ground glass-stoppers are removed with the aid of a barricaded, remotely operated top extractor. The fumes are evacuated under an exhaust hood, and the sample is drowned under water in an explosive bucket. This operation and the equipment used is pictured in Photo 5.

It has been established that if a test sample of propellant takes 20 days to deteriorate under high temperature, then the same propellant lot stored under normal temperatures would take considerably longer to become actually hazardous enough to proceed to spontaneous mass deflagration. This allows an ample safety margin for the location, eventual inspection, and testing of the parent lot.

PHOTO 1

Five-pound surveillance samples of propellants are stored in magazines at Picatinny Arsenal until the parent lot is consumed, declared obsolete, or a pronounced instability is revealed by testing.

PHOTO 2

A 45-gram test sample is obtained in an operation that is performed 100 feet away from the storage magazine.

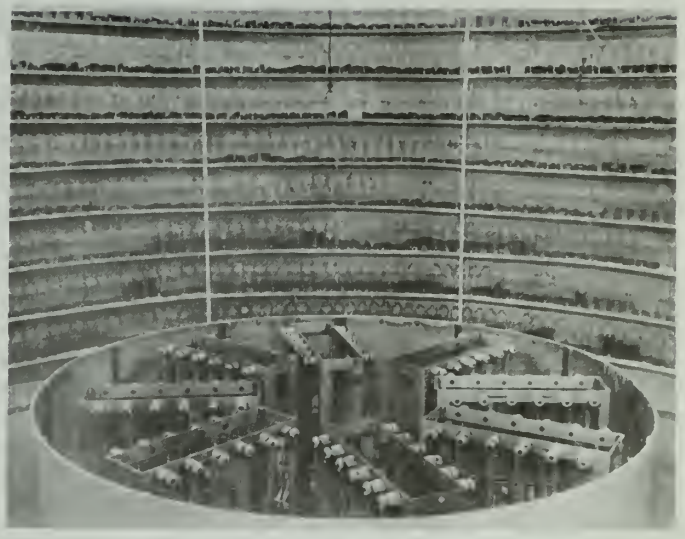


PHOTO 3

Test chambers such as the one shown above accommodate 2,000 samples at an electronically controlled temperature of 65.5°C.

PHOTO 4

Test operators wear face shields or safety glasses, safety uniforms, protective vests, and asbestos gloves (not shown).

PHOTO 5

A barricaded remotely operated top extractor and an exhaust hood are used when fuming samples are removed from the heat chamber. The opened samples are drowned under water in an explosive bucket.

HERCULES SAFETY THEATER

Safety Department
Hercules Powder Company
Sunflower Army Ammunition Plant

The Hercules Powder Company, operating contractor of the Sunflower Army Ammunition Plant, has a novel safety teaching aid. The "Principle of Opposites" is used to demonstrate visually both a safe and an unsafe condition.

A rectangular box has been fabricated and placed on a pedestal. A window that simulates a television screen is installed in one end. Two equal sized compartments, one in the front and one in the rear, are constructed with a one-way mirror installed in the partition.

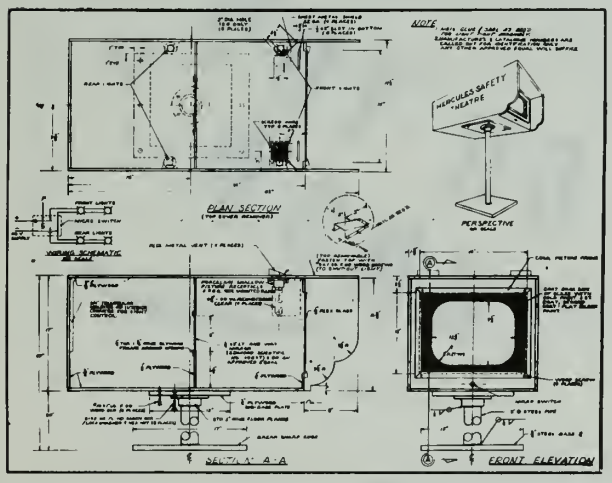
Lights in each compartment are controlled with a normally-open, normally-closed micro-switch. The front compartment lights are lit until the switch is activated; then the rear bulbs light and the front compartment is darkened. This permits viewing the back scene through the one-way mirror. Many interesting and instructive tableaus may be created, depicting both on-plant and off-plant safety hazards.

Earl O. McElhany, Project Engineer, who originated the idea, believes that his "Use Your Safety Belt" has caused more comment from viewers than any other plant safety display.

A large sign, "Peep Show," was placed on each side of the theater. A sign, "Girls - Girls - Girls -- Men Only," was mounted on top. Two hula-hula dancing dolls were put in the front compartment with a sign, The sign said "Forget the girls - protect your loved ones - push button." When the lights were turned off in front, the rear lights came on, permitting the viewer to see a doll sitting with a seat belt fastened. Beside her was a monkey with a banana in his hand and no seat belt. Attached to the monkey was a small sign saying, "Don't be a monkey - buckle up."

When this was written a good housekeeping theme was on display. A museum, containing a book 153 years old, a company service pin, models of antique cars, and other artifacts was placed in the front section. The sign read, "If not useful or valuable - do as others do." The back section, viewed when the switch is activated, showed a panoramic mountain scene made of plaster of Paris, with seven varieties of pine cones for trees. A dump truck loaded with trash is on a highway. Road signs point toward the city dump, indicating the "Good Housekeeping" theme.

In order that the greatest number of individuals may be motivated, the theater is moved from department to department throughout the month. A detailed drawing of the theater may be obtained by written request to: Safety Department, Hercules Powder Company, Sunflower Army Ammunition Plant, Lawrence, Kansas 66044.



Sketch shows details of a safety teaching aid that has been fabricated and placed in use by the Safety Department, Hercules Powder Company, Sunflower Army Ammunition Plant, Lawrence, Kansas.

Photo shows fabricated safety teaching aid at Sunflower Army Ammunitic Plant.

The following questions on safety will test your ready knowledge of ten subjects covered by AMCR 385-224. How many can you answer? Try them before turning to the answers on pages 42 and 43.

1. What is the maximum height permitted for a fixed ladder without a cage or basket guard?

Answer and Reference:

2. Are storage compatibility groupings equivalent to hazard classifications established for quantity-distance requirements?

Answer and Reference:

3. Is it permissible to use alcohol for cleaning exudate before blast cleaning of an item?

Answer and Reference:

4. What metal tools are permissible for use inside a freight car when loading and unloading containers of bulk explosives?

Answer and Reference:

5. What is the cardinal principle to be observed in any location or operation involving explosives, ammunition, severe fire hazards or toxic materials?

Answer and Reference:

6. Is it permissible to use railway classification yards for motor vehicle interchange yards?

Answer and Reference:

7. Chemical agents of which group are the most dangerous to handle?

Answer and Reference:

8. Would 500,000 gallons of stored water be considered an adequate supply in an explosives manufacturing area?

Answer and Reference:

9. What is the preferred type of structure for the storage of all explosives and ammunitions?

Answer and Reference:

10. At what distance shall material awaiting destruction be stored from explosives that are being destroyed?

Answer and Reference:

SPECIAL EXTENSION COURSE IN SAFETY MANAGEMENT

Mr. Philip M. Edwards, Safety Officer with the U.S. Army Test & Evaluation Command, Aberdeen Proving Ground, Maryland, has just completed all phases of both the Basic and Advanced levels of the Special Extension Course in Safety Management offered by the U.S. Army Adjutant General School. Mr. Edwards is the first Army civilian career employee to complete the entire program of 455 credit hours, and he is to be commended on his initiative and desire for self-development. Mr. Edwards is a health physicist in the 1306 job series and is in the process of applying for eligibility in the safety job series. If we can fill the ranks of the Army Safety Program with personnel exhibiting the drive demonstrated by Mr. Edwards, there will be no need to worry about the future -- it will take care of itself.

REFERENCE PUBLICATIONS

AR 55-228, Change 2, 30 November 1965
Transportation and Travel - Transportation by Water of Explosives and Hazardous Cargo. Section VII (Added) Handling and Storage of Nuclear Weapons at Water Terminal and Aboard MSTS Ships.

AR 75-85, 25 April 1966
Explosives- Authority to Waive Ammunition and Explosives Quantity-Distance Safety Standards.

AR 360-28, 1 April 1966
Army Information - Guidance for Conduct of Information Actions in Support of Army Air Defense Command Missile Program.

AR 360-61, 6 May 1966
Army Information - Community Relations
(See paragraphs 13b(1)(a); 13d; 14b(1); 23d; and 24)

AR 700-20, 7 March 1966
Logistics - Type Classification and Reclassification of Material.

AR 740-32, 7 April 1966
Storage and Shipment of Supplies and Equipment - Responsibilities for Technical Escorts of Chemical, Biological, and Etiological Agents.

AR 746-5, 18 April 1966
Marking and Packing of Supplies and Equipment - Color and Marking of Army Materiel
(Attention is invited to paragraph 23g which states that: "DA Label 76 (A Good Driver) intended to promote safe driving practices will be displayed in all motor vehicles to be readily visible to the driver.")

AMCR 95-2, 22 April 1966
Aviation - Authorization to Fly U.S. Army Aircraft.

DA Cir 36-1-6, 6 April 1966
Audit - Audit Trends
(See paragraph 6, Third party liability for personal injuries.)

DA Cir 350-37, 6 April 1966
Education and Training - Army Aviation Safety Course.

Continued on page 39

NATIONAL SAFETY COUNCIL AWARD NOTIFICATIONS

Rock Island Arsenal has qualified for a National Safety Council Award of Honor for operating 3,487,544 man-hours without a disabling injury from 16 September 1965 to 27 January 1966.

Savanna Army Depot has been notified that a National Safety Council Award of Honor will be forwarded for operating 4,108,365 man-hours without a disabling injury from 13 August 1963 to 28 February 1966.

Jefferson Proving Ground will receive a National Safety Council Award of Merit for the operation of 1,034,267 man-hours without a disabling injury from 22 December 1964 to 21 March 1966.

REFERENCE PUBLICATIONS
(Continued)

DA Cir 385-10, 21 April 1966
Safety - Safety Training In Civilian Institutions.

DA Cir 385-11, 20 April 1966
Safety - Mission Safety-70 Film -- More Safely Tomorrow

TB Med 270, December 1965
Control of Hazards to Health from Microwave Radiation

DA Pam 385-1, Change 1, 10 March 1966
Unit Safety Management - Safety in Maneuvers and Field Training Exercises.

AMC SAFETY AWARD PRESENTATIONS

● SAVANNA ARMY DEPOT WINS AMC SAFETY AWARD

Colonel B. B. Abrams (left), Commander, Savanna Army Depot, is shown as he accepted the AMC Award of Merit for the installation's FY 1965 safety record. Colonel Earl K. Buchanan (right), Commander of the Lexington-Blue Grass Army Depot, presented the award as the representative of the Commanding General, U.S. Army Supply and Maintenance Command.

● SPRINGFIELD ARMORY WINS AMC AWARD OF MERIT

Brigadier General Charles M. Prosser, Deputy Commanding General, U.S. Army Weapons Command, is shown presenting the AMC Award of Merit for Safety for FY 1965 to Colonel Arthur H. Sweeney, Jr., Commanding Officer, Springfield Armory. Looking on at right is Lyman E. Pevey, the Arsenal's Safety Director.

PROTECTIVE SKIN CREAMS

Arnold E. Larson, Safety Engineer
Picatinny Arsenal

When protective clothing is not feasible or would impede the employee in the performance of his job, a protective skin cream is used to prevent dermatitis (skin disease).

These creams leave the hands or other portions of the body covered with a thin film which will act as a barrier against specified irritant substances. There are three main categories into which protective creams can be divided. Vanishing cream contains soap which remains in the pores of the skin and helps to remove dirt when it is washed off. Water-repellant creams leave a thin film of water-repellant substance such as lanolin, wax or silicones on the skin. The film prevents water-soluble irritants such as weak acids and weak alkalies from contacting the skin. Solvent-repellant creams may contain oil and other chemical agents which repel specific solvents.

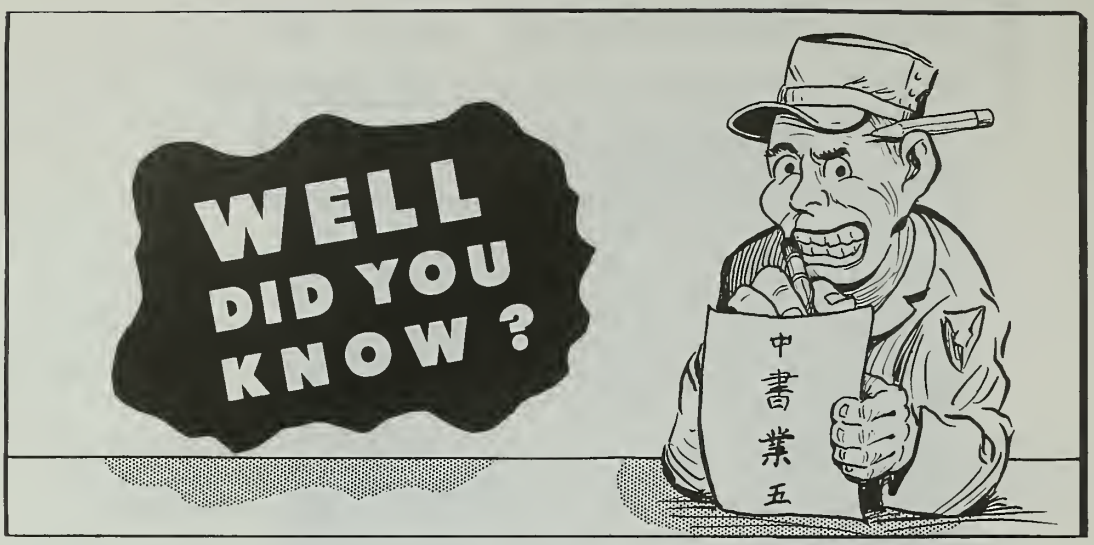
In order to use protective creams properly these simple rules must be obeyed:

1. Apply only to clean skin.

2. Remove by washing with a cleaner when the area becomes excessively soiled.

3. Dry the skin thoroughly before reapplication of the cream.

Protective creams are applied before work is started, are washed off before lunch, usually reapplied after lunch and washed off again before going home from work. Proper use will afford protection as a barrier to harmful substances will lead the employee to wash at least twice during the work shift, thereby promoting better personal hygiene.



Answers are given **below** for the questions that appear on pages **36** and **37**. If you answer all of them correctly, you may mark your answer sheet "excellent." All questions were based on information contained in AMCR 385-224. A reference to the pertinent paragraph follows each answer.

1. Where fixed ladders exceed twenty feet in height, a cage or basket guard (beginning not more than eight feet above grade) or other acceptable device to prevent falling shall be provided. Reference: Paragraph 512b.

2. The storage compatibility groupings and the hazard classifications established for quantity-distance requirements should not be confused. Section 17, AMCR 385-224, provides the quantity-distance regulations and tables for ammunition and explosives. Section 19 contains the storage compatibility tables into which explosives and ammunition are grouped. Reference: Paragraph 1903

3. The use of alcohol to clean exudate from an explosives filled or chemical-filled item that is to be sand blasted is prohibited. The exudation can be properly removed with the application of an approved solvent. Reference: Paragraph 2509b.

4. Hammers and pinch bars are the only metal tools that should be used inside freight cars during loading and unloading containers of bulk explosives. Reference: Paragraph 2113.

5. Limit the exposure of a minimum number of personnel, for a minimum time, to a minimum amount of the hazardous material consistent with safe and efficient operations. Reference: Paragraph 1601a.

6. Railway classification yards may be used as motor vehicle interchange yards. Reference: Paragraph 2210d.

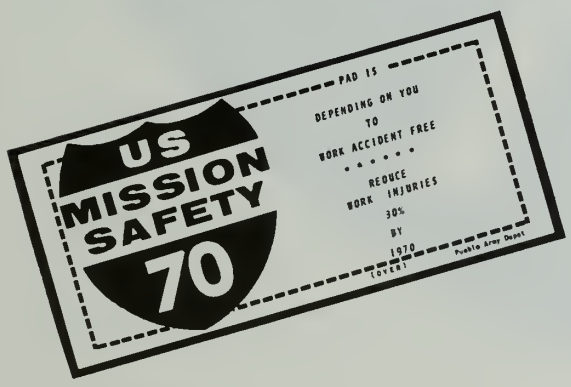
7. Group A chemical agents (blister gasses) are the most dangerous to handle. Reference: Paragraph 2909a.

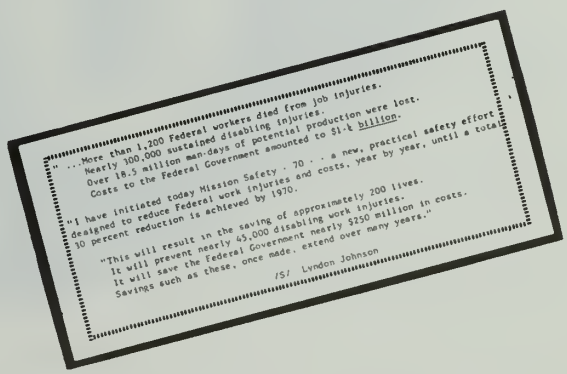
8. At least 1,000,000 gallons of water shall be stored or available for fire fighting in load line and in explosives manufacturing areas. Reference: Paragraph 1225a.

9. Earth-covered magazines are the preferred type of storage structure for all explosives and ammunition. Reference: Paragraphs 1802a and 1803a.

10. Material awaiting destruction shall be stored at not less than intraline distance from explosives being destroyed. Reference: Paragraph 2710.

MISSION SAFETY-70 ENVELOPE INSERT




"...More than 1,200 Federal workers died from job injuries.
Nearly 300,000 sustained disabling injuries.
Over 18.5 million man-days of potential production were lost.
Costs to the Federal Government amounted to $1-k billion.

"I have initiated today Mission Safety . 70 . . a new, practical safety effort designed to reduce Federal work injuries and costs. year by year, until a total 10 percent reduction is achieved by 1970.

"This will result in the saving of approximately 200 lives.
It will prevent nearly 65,000 disabling work injuries.
It will save the Federal Government nearly $250 million in costs.
Savings such as these, once made, extend over many years."

/S/ Lyndon Johnson

Pueblo Army Depot has developed a 3 1/2 X 7 3/8 inch insert to aid in the promotion of Mission Safety-70. The "stuffer" is suitable for mailing with pay checks, personnel notices, and other interoffice correspondence.

The front of the insert shows the Mission Safety-70 shield and the words, "PAD is depending on you to work accident free... Reduce work injuries 30% by 1970." The reverse contains quotations from the President's announcement of the drive to reduce Federal work injuries and costs.

SAFETY NOTES

WORK SAFELY- "REDUCE FEDERAL EMPLOYEE WORK INJURIES 30% BY 1970"

FEDERAL SAFETY COUNCIL

UNIVERSITY OF FLORIDA
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FLARE

UNITED STATES ARMY MATERIEL COMMAND

WASHINGTON, D.C. 20315